DOE Programs for Improving the Nuclear Engineering Education Infrastructure

"Universities, Industry and Government: Partners for the Future of Nuclear Engineering and Technology"

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Office of Nuclear Energy, Science and Technology
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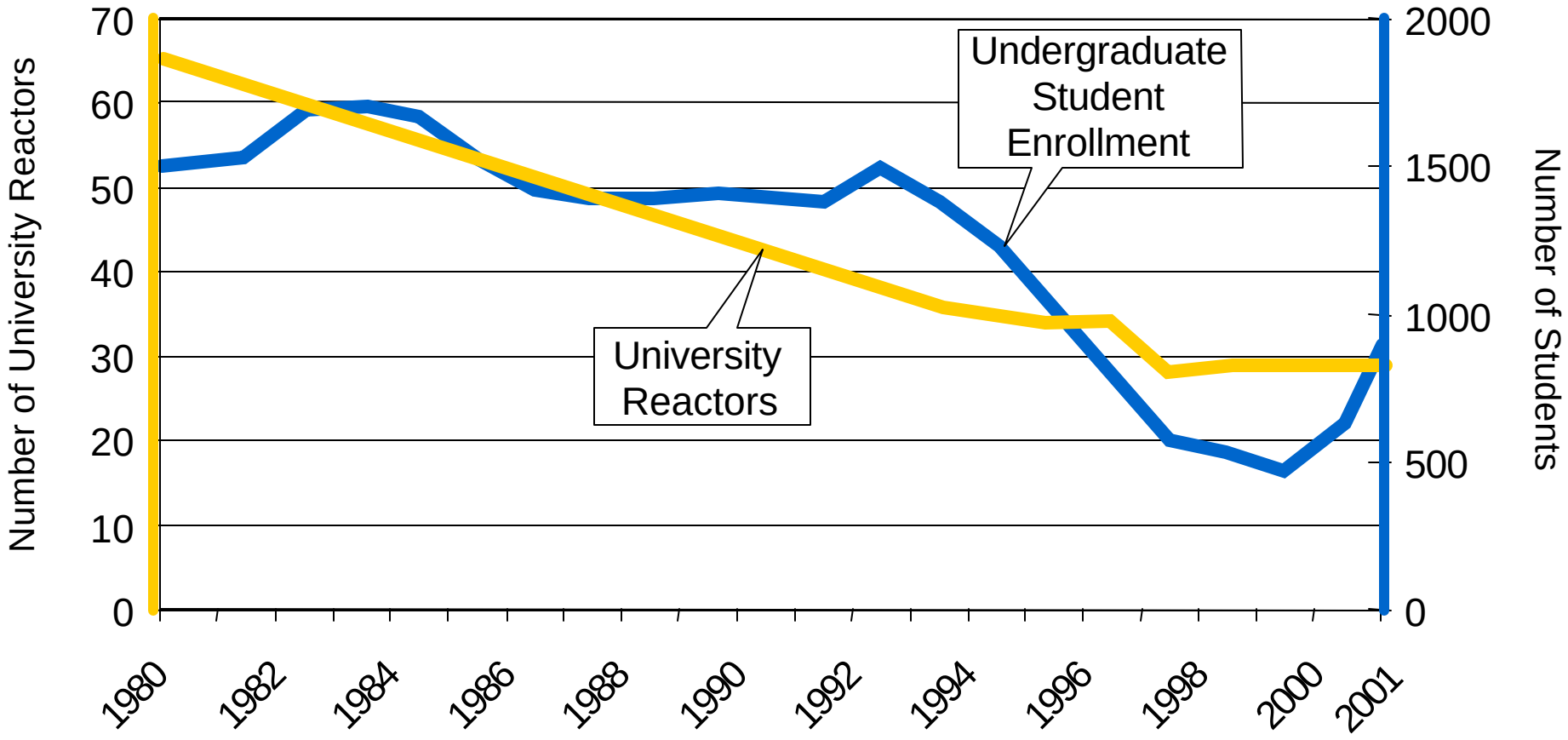
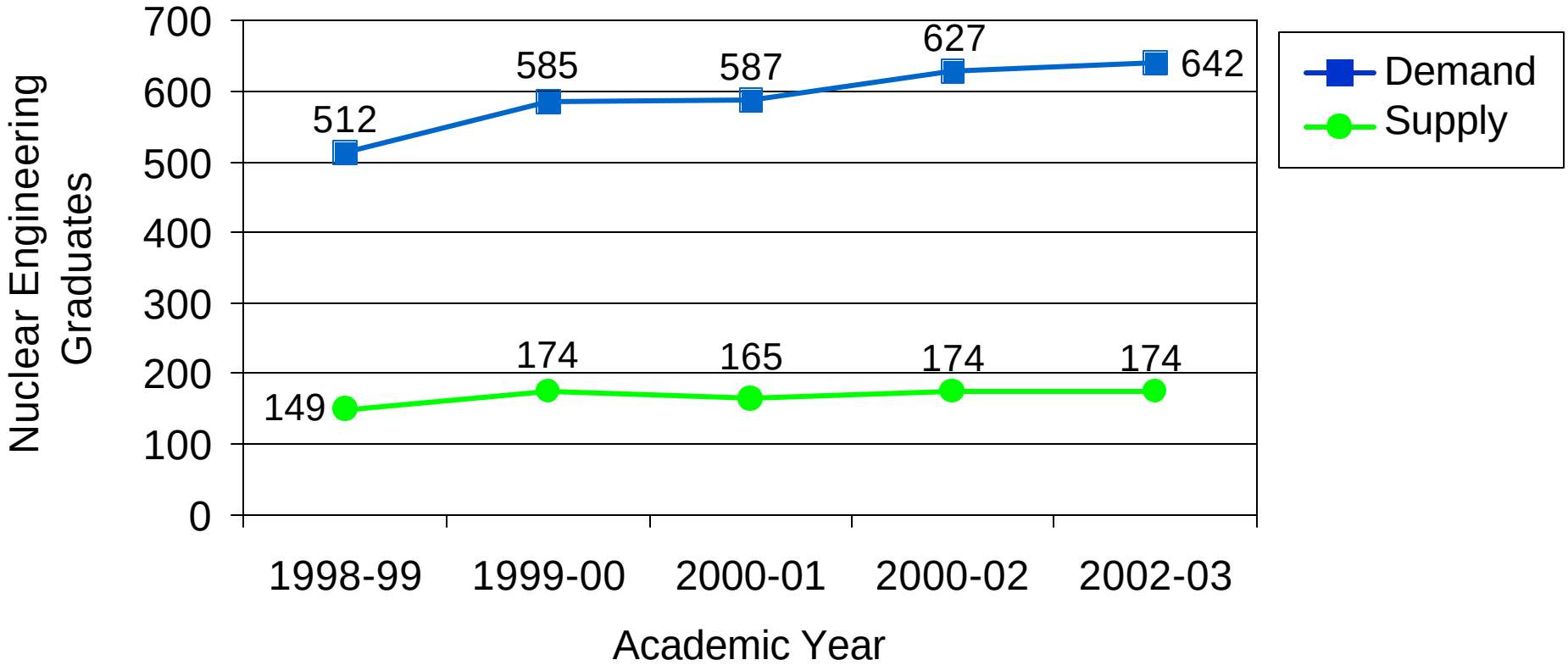
Trends in Enrollments and University Reactors



NEDHO Projection of Shortage in Nuclear Engineering Graduates (BS and MS)



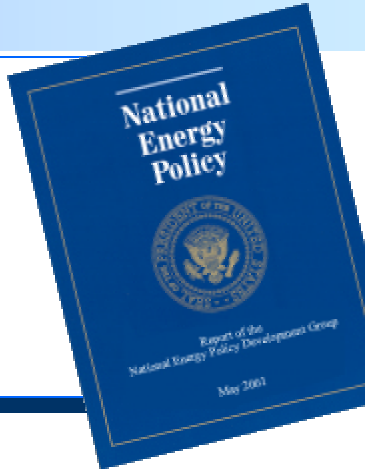
Recent Reports Focusing on Manpower and Infrastructure Concerns

- **"Nuclear Education and Training: Cause for Concern" (OECD, 2000)**
- **"Manpower Supply and Demand in the Nuclear Industry" (NEDHO, 2000)**
- **"The Future of Nuclear Engineering Programs and University Research and training Reactors" (NERAC, 2000)**
- **"Report of the University Research Reactor Task Force" (NERAC, 2000)**
- **"NEI Recruiting and Staffing Task Force" (Nuclear Energy Institute)**

The U.S. *National Energy Policy* and Nuclear Power

"The NEPD Group recommends that the President support the expansion of nuclear energy in the United States as a major component of our national energy policy."

Report of the National Energy Policy Development Group, May 2001



Calvert Cliffs Nuclear Power Plant:
The first U.S. plant to receive an extended operating license.

NEP Nuclear Energy Recommendations:

- Provide a deep geological repository
- Extend Price-Anderson liability coverage
- Support uprating and relicensing existing nuclear power plants
- Support licensing new nuclear reactors
- Develop advanced nuclear fuel cycles and next generation technologies
- Consider advanced reprocessing and fuel treatment technologies

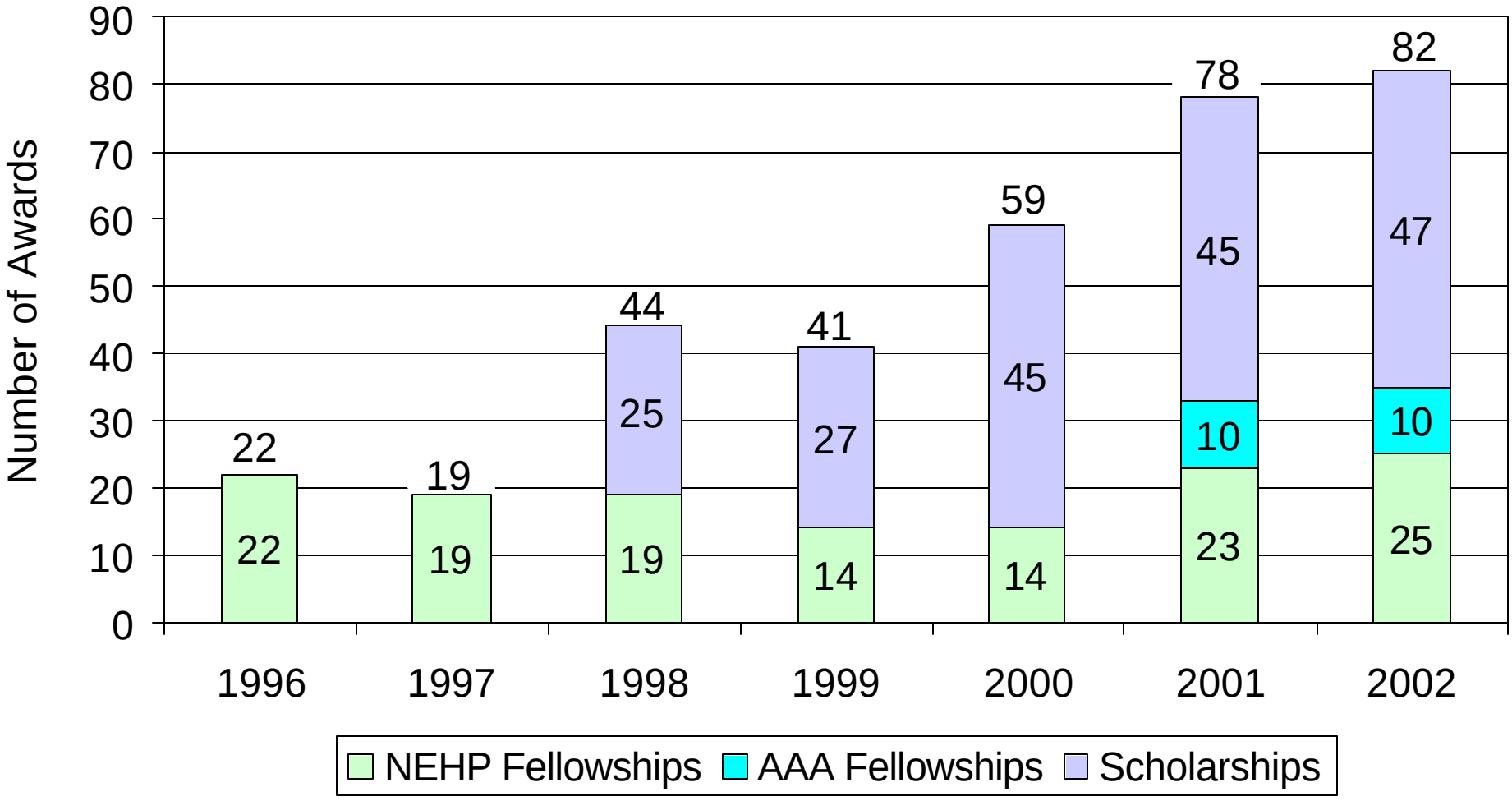
University Nuclear Science and Reactor Support

- **The "University" Program has nine distinct activities:**
  - Innovations in Nuclear Infrastructure and Education
  - Nuclear Engineering Education Research
  - Matching Grants
  - Reactor Sharing
  - Fellowships and Scholarships
  - University Reactor Instrumentation
  - Fresh Fuel/Spent Fuel Services
  - Radiochemistry
  - Nuclear Engineering Education Opportunities

Other DOE Programs Supporting Nuclear Education

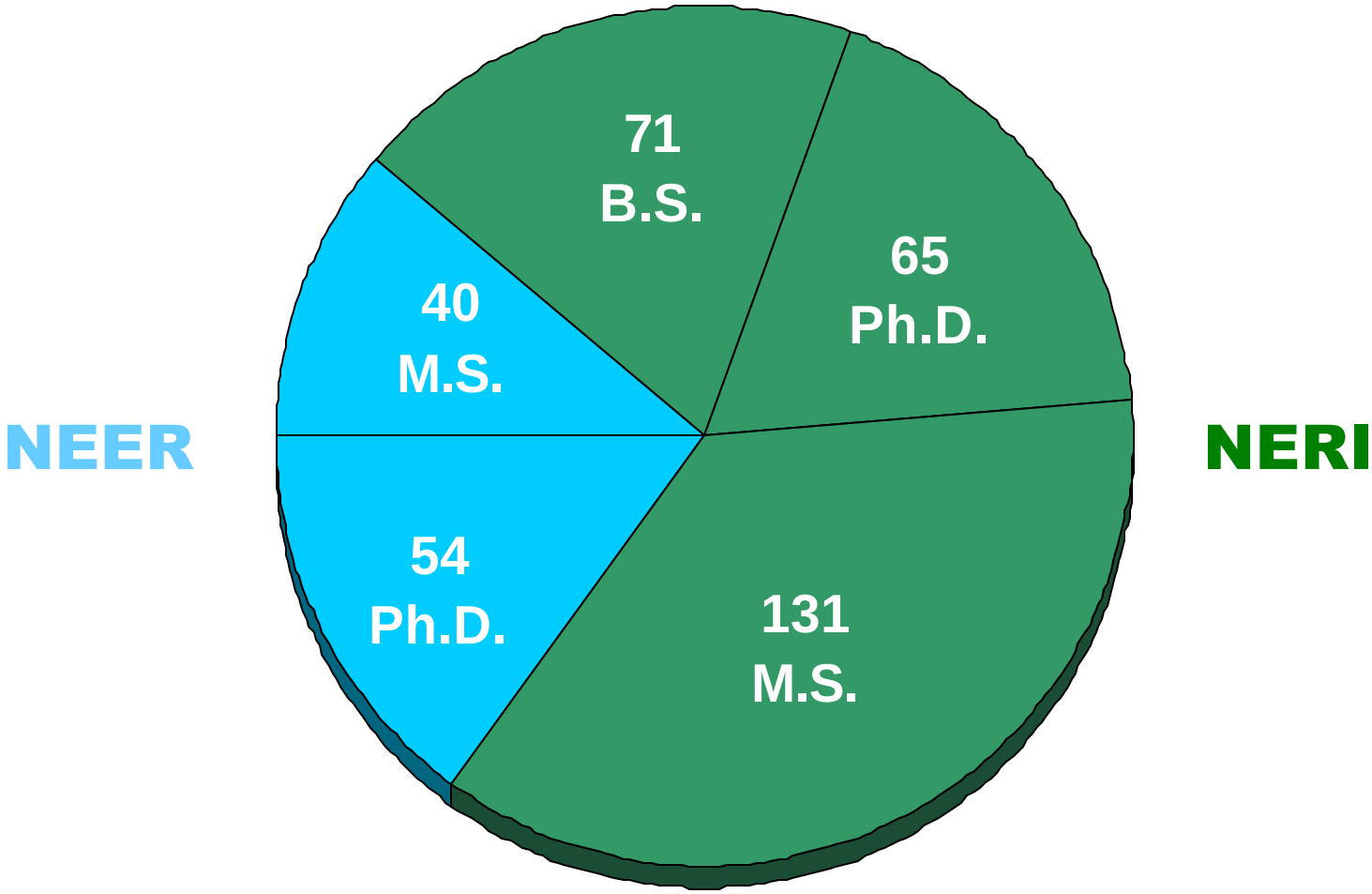
- **Nuclear Energy Plant Optimization (NEPO) -- R&D program in partnership with nuclear industry to ensure the viability of the Nation's existing power plants**
  - NEPO makes R&D awards to minority educational institutions
- **Nuclear Energy Research Initiative (NERI) -- new and innovative nuclear science and engineering R&D**
  - NERI involves students in R&D at universities, national laboratories and industry.
- **Advanced Fuel Cycle Initiative -- research into the transmutation of spent nuclear fuel**
  - Supports advanced R&D at UNLV
  - Sponsors a fellowship program in transmutation-related disciplines

Fellowships and Scholarships



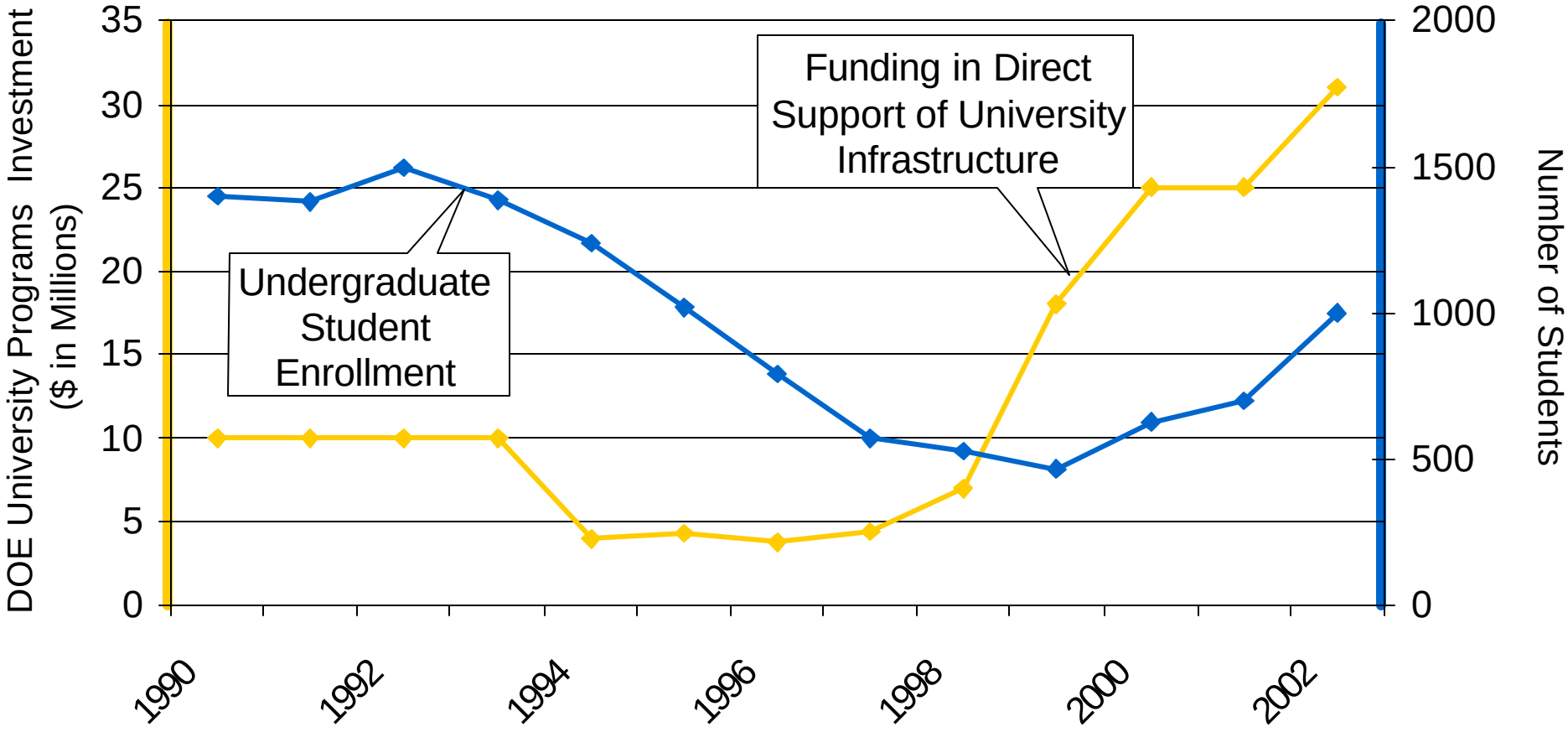
Student Involvement in NEER/NERI Research

1999-2001



Total over 3 years: 361

Trends In Enrollments Versus DOE University Program Investment



Innovations In Nuclear Infrastructure And Education (INIE)

$5.5 million awarded to:

- ***Western Nuclear Science Alliance*** **($1.2M)**
  - Oregon State, California-Davis, California-Berkeley, Washington State, Idaho State
- ***BIG-10 Consortium*** **($1.97M)**
  - Penn State, Wisconsin, Purdue, Illinois
- ***MIT/Rhode Island Nuclear Science Center*** **($1.1M)**
- ***Southwest Consortium*** **($1.05M)**
  - Texas A&M, Texas-Austin, New Mexico

Plan 1-3 additional INIE's

- ***Missouri, Michigan, North Carolina State***

New Nuclear Engineering Programs

Two new nuclear engineering programs initiated in 2002

- ***South Carolina State* -- Orangeburg, South Carolina**
  - Only HBCU to offer a degree in nuclear engineering (undergraduate)
- ***University of South Carolina***
  - Graduate program in nuclear engineering
- **Both programs recently approved by the South Carolina Commission on Higher Education**

More to come

DOE's Expanding Nuclear Educational Initiatives

- **Expand the International Student Exchange Program beyond the current nations (France, Germany and Japan) to Argentina, Brazil, Mexico and Russia**
- **Increase University partnerships**
  - 5 currently in place
  - Plan to add 3 additional, including University of Missouri and Polytechnical University of Puerto Rico
- **Develop faculty exchanges between U.S. nuclear engineering universities and their international counterparts**

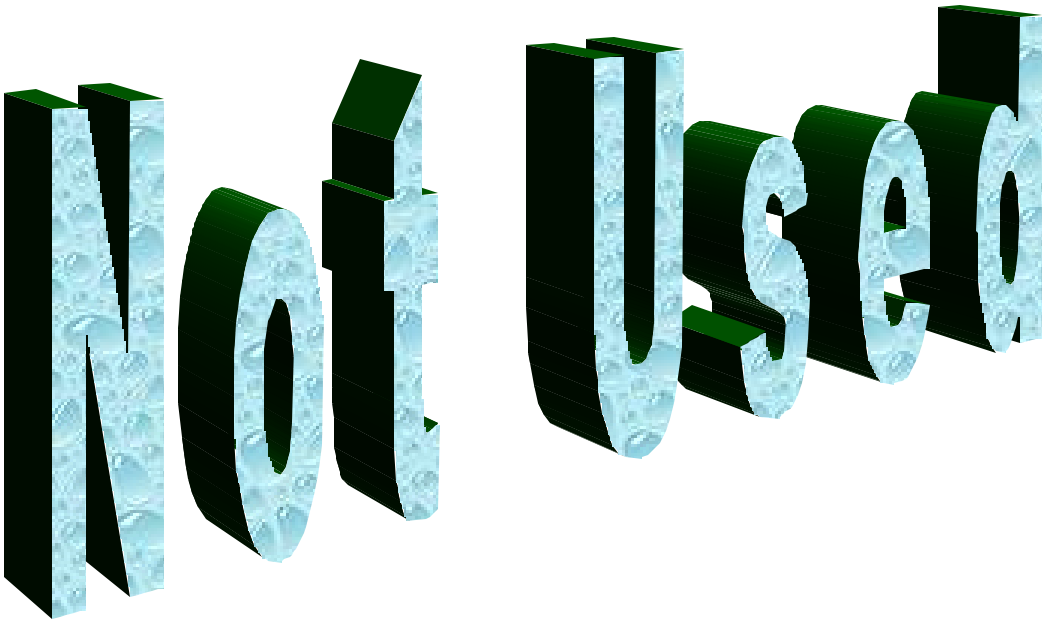
Nuclear Power Engineering Curriculum Task Force

- Nuclear engineering departments may not be producing engineers with training optimal to the needs of industry
- The Nuclear Energy Research Advisory Committee (NERAC) has launched a task force headed by Professor Andrew Klein of Oregon State to examine this issue
- If found to have merit, the Task Force will work with expert consultants to outline an optimal curriculum as a model for use by university nuclear engineering departments
- Before products are finalized, NERAC will review the draft conclusions with the broader nuclear industry and university community

The Future . . .

- . . . is bright
- More work needs to be done -- by Government, Industry, and Academia
- Building new plants is key to maintaining a viable educational infrastructure
- DOE is here to help

www.nuclear.gov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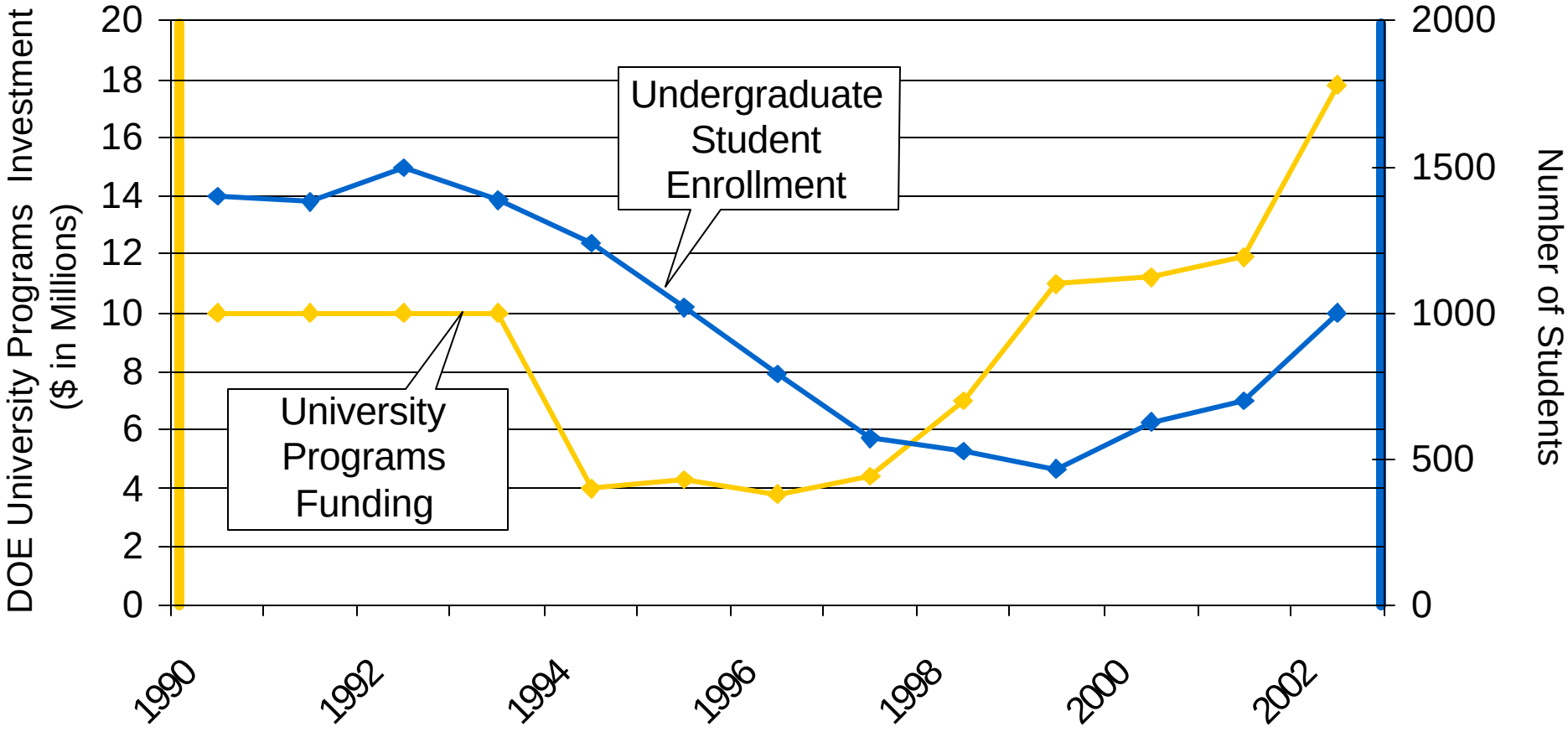
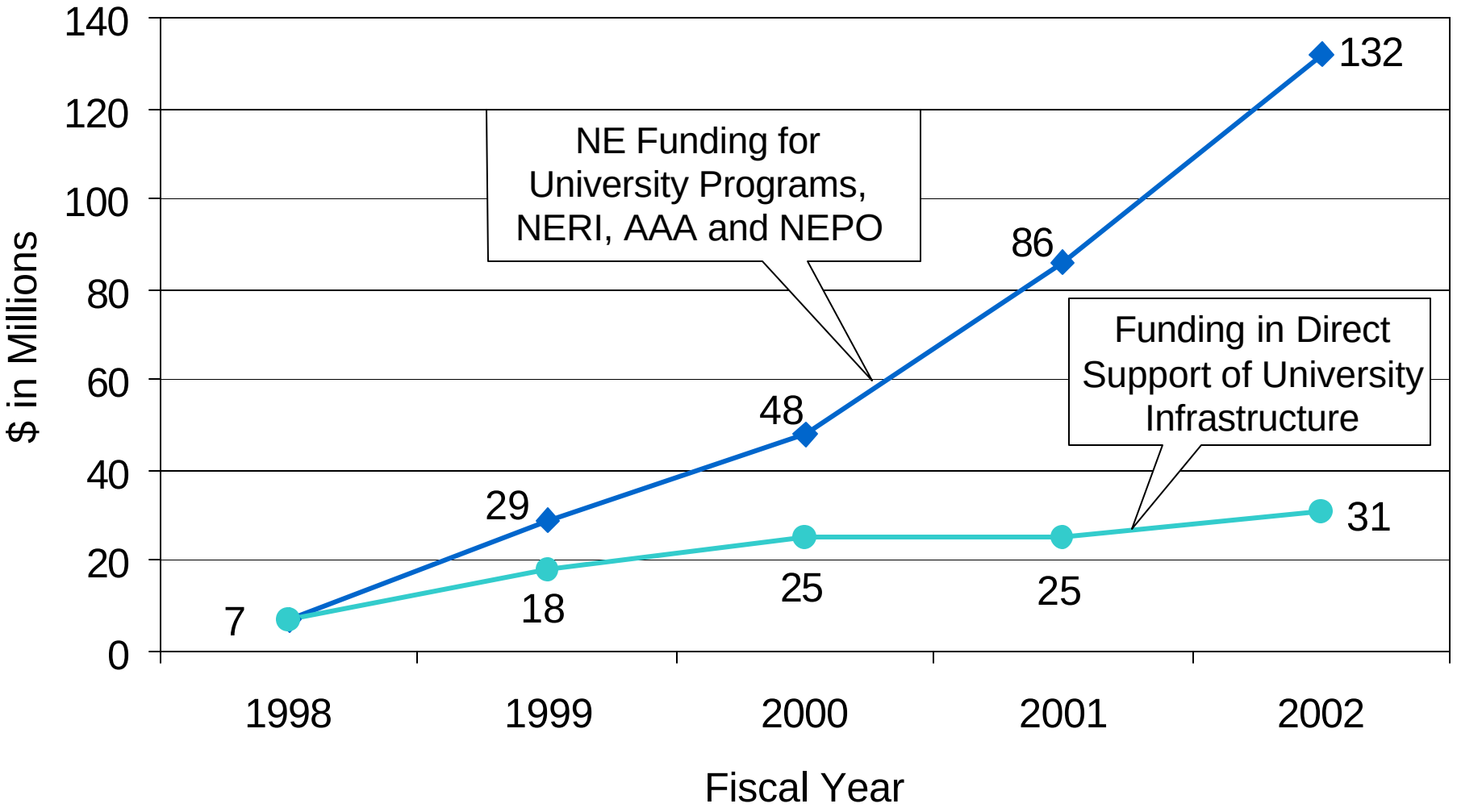
Trends In Enrollments Versus DOE University Program Investment



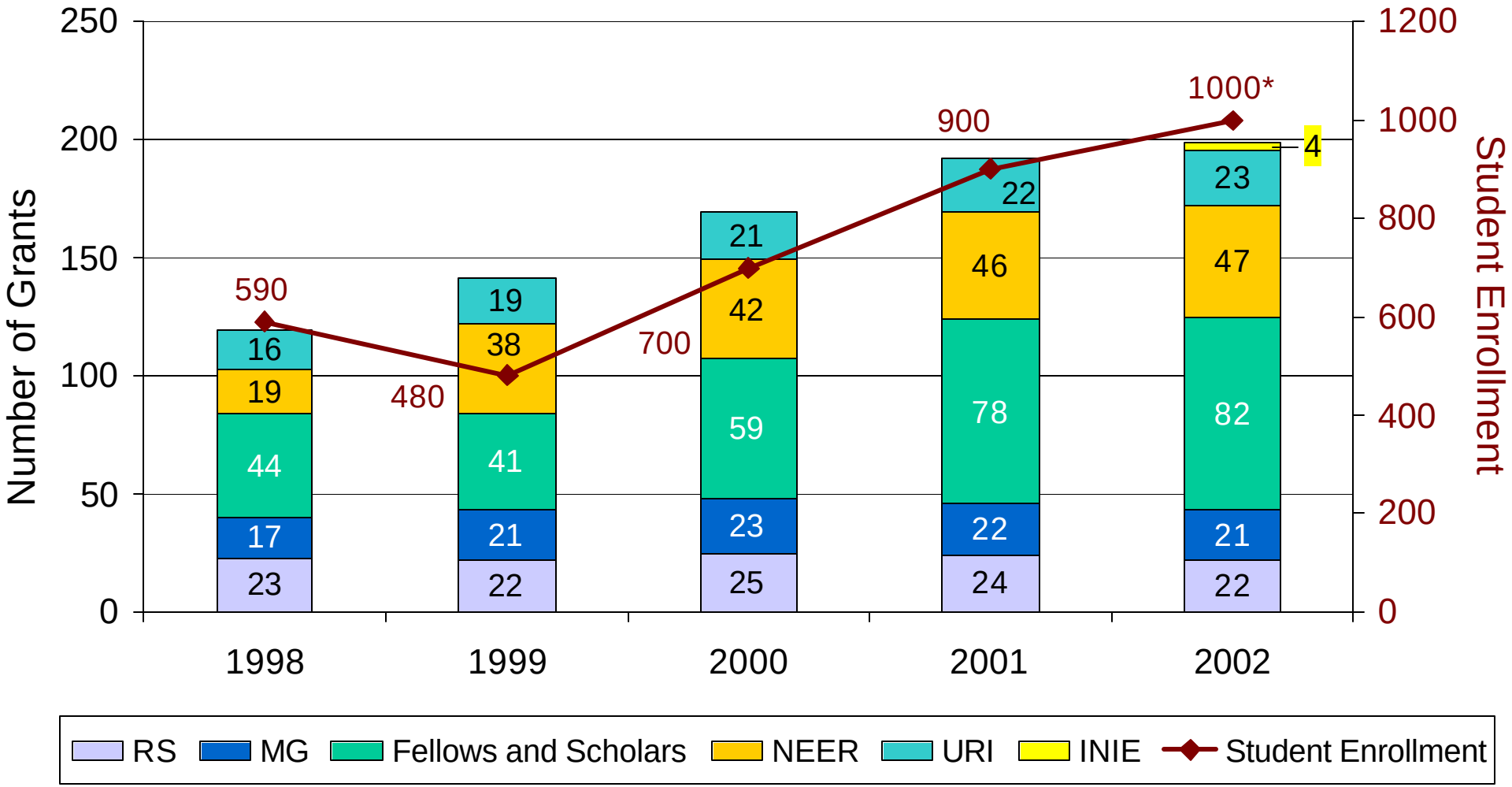
DOE/NE Programs Supporting the Nuclear Infrastructure



Federal Government Need for Nuclear Engineers

- Energy
- Safety
- Environment
- Space Exploration
- Isotopes
- Radiochemistry
- Defense
- Radiological Protection/Evaluation
- Medical
- Nonproliferation

University Program Grants By Year



*Estimated

Student Involvement In NEER/NERI Research